

What is claimed is:

1. An electron beam lithography apparatus for providing a one-to-one projection of a pattern, comprising:
  - a pyroelectric emitter, which is disposed a predetermined distance apart from a substrate holder, the pyroelectric emitter including a pyroelectric plate having a dielectric plate on a surface thereof and a patterned semiconductor thin film on the dielectric plate facing the substrate holder;
  - a heating source for heating the pyroelectric emitter; and
  - a pair of magnets disposed beyond the pyroelectric emitter and the substrate holder, respectively, to control paths of electrons emitted by the pyroelectric emitter.
2. The apparatus as claimed in claim 1, wherein each of the pair of magnets is an electromagnet or a permanent magnet.
3. The apparatus as claimed in claim 1, further comprising an adhesion layer having a predetermined thickness between the pyroelectric plate and the dielectric plate.
4. The apparatus as claimed in claim 1, wherein the heating source is a contact-type heating plate using resistive-type heating.

5. The apparatus as claimed in claim 1, wherein the heating source is a remotely controlled heater that generates infrared rays.

6. The apparatus as claimed in claim 1, wherein the pyroelectric plate is formed of a pyroelectric material selected from the group consisting of LiNbO<sub>3</sub>, LiTaO<sub>3</sub>, BaTiO<sub>3</sub>, and Pb(Zr,Ti)O<sub>3</sub>.

7. The apparatus as claimed in claim 1, wherein the dielectric plate is a sapphire plate.

8. The apparatus as claimed in claim 1, wherein the dielectric plate has a thickness in a range of about 0.1 to about 1 mm.

9. The apparatus as claimed in claim 1, wherein the semiconductor thin film is a silicon thin film.

10. The apparatus of claim 1, wherein the semiconductor thin film has a thickness in a range of about 100 to about 10,000 Å.

11. An electron beam lithography apparatus for providing an x-to-one projection of a pattern, comprising:

a pyroelectric emitter, which is disposed a predetermined distance apart from a substrate holder, the pyroelectric emitter including a pyroelectric plate having a dielectric plate on a surface thereof and a

patterned semiconductor thin film on the dielectric plate facing the substrate holder;

a heating source for heating the pyroelectric emitter; and

a deflection unit disposed between the pyroelectric emitter and the substrate holder to control paths of electrons emitted by the pyroelectric emitter.

12. The apparatus as claimed in claim 11, further comprising an adhesion layer having a predetermined thickness between the pyroelectric plate and the dielectric plate.

13. The apparatus as claimed in claim 11, wherein the deflection unit comprises:

deflection plates for deflecting electrons emitted from the pyroelectric emitter; and

at least one magnetic lens for focusing the deflected electrons.

14. The apparatus as claimed in claim 11, wherein the heating source is a contact-type heating plate using resistive-type heating.

15. The apparatus as claimed in claim 11, wherein the heating source is a remotely controlled heater that generates infrared rays.

16. The apparatus as claimed in claim 11, wherein the pyroelectric plate is formed of a pyroelectric material selected from the group consisting of  $\text{LiNbO}_3$ ,  $\text{LiTaO}_3$ ,  $\text{BaTiO}_3$ , and  $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$ .

17. The apparatus as claimed in claim 11, wherein the dielectric plate is a sapphire plate.

18. The apparatus as claimed in claim 11, wherein the dielectric plate has a thickness in a range of about 0.1 to about 1 mm.

19. The apparatus as claimed in claim 11, wherein the semiconductor thin film is a silicon thin film.

20. The apparatus as claimed in claim 11, wherein the semiconductor thin film has a thickness in a range of about 100 to about 10,000 Å.

21. A method of fabricating a pyroelectric emitter, which is disposed a predetermined distance apart from a substrate holder, the pyroelectric emitter including a pyroelectric plate having a dielectric plate on a surface thereof and a patterned semiconductor thin film on the dielectric plate facing the substrate holder, the method comprising:

preparing a pyroelectric plate;

preparing a patterned mask by forming a patterned semiconductor thin film on a dielectric plate having a predetermined thickness; and disposing the patterned mask on the pyroelectric plate.

22. The method as claimed in claim 21, wherein preparing the patterned mask comprises:

sequentially forming a semiconductor thin film having a predetermined thickness and a resist on the dielectric plate having the predetermined thickness;  
patterning the resist in a predetermined pattern;  
patterning the semiconductor thin film using the patterned resist as a mask; and  
removing the patterned resist.

23. The method as claimed in claim 21, wherein disposing the patterned mask on the pyroelectric plate comprises forming an adhesion layer on the pyroelectric plate and adhering the patterned mask on the adhesion layer.

24. The method as claimed in claim 21, wherein the pyroelectric plate is formed of a pyroelectric material selected from the group consisting of  $\text{LiNbO}_3$ ,  $\text{LiTaO}_3$ ,  $\text{BaTiO}_3$ , and  $\text{Pb}(\text{Zr},\text{Ti})\text{O}_3$ .

25. The method as claimed in claim 21, wherein the dielectric plate is formed of sapphire.

26. The method as claimed in claim 21, wherein the dielectric plate is formed to a thickness in a range of about 0.1 to about 1 mm.

27. The method as claimed in claim 21, wherein the semiconductor thin film is formed of silicon.

28. The method as claimed in claim 21, wherein the semiconductor thin film is formed to a thickness in a range of about 100 to about 10,000 Å.